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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/628,618	07/28/2003	Hieronymus Andriessen	223592	5841
23460	7590	04/20/2005	EXAMINER	
LEYDIG VOIT & MAYER, LTD TWO PRUDENTIAL PLAZA, SUITE 4900 180 NORTH STETSON AVENUE CHICAGO, IL 60601-6780			XU, LING X	
			ART UNIT	PAPER NUMBER
			1775	

DATE MAILED: 04/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/628,618

Applicant(s)

ANDRIESSEN, HIERONYMUS

Examiner

Ling X. Xu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 4-11 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12-22, 26 and 27 is/are allowed.
- 6) ☒ Claim(s) 1-3, 23 and 24 is/are rejected.
- 7) ☒ Claim(s) 25 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicants' amendments filed on 2/15/2005 have been entered.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-3 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 was amended to include limitation that the nano-porous metal oxide further comprises a phosphoric acid and a phosphate, which was not described in the specification. The specification only states that the nano-porous metal oxide comprises a phosphoric acid or a phosphate (see page 7 of the specification). Accordingly, the amended claims 1-3 contain new matter, which is not supported by the specification.

*Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 23-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Vogel et al. (J. Phys. Chem. 1994, 98, p3183-3188).

Vogel discloses the sensitization of nano-porous metal oxide semiconductor such as titanium oxide, tin oxide, niobium oxide and tantalum oxide by quantum-sized cadmium sulfide, lead sulfide, or antimony sulfide (“metal chalcogenide nano-particles”) (abstract).

Since Vogel discloses the same metal oxide such as titanium oxide, tin oxide, niobium oxide and tantalum oxide and same metal chalcogenide such as quantum-sized cadmium sulfide, lead sulfide, antimony sulfide as claimed in the present application. The same metal oxide and metal chalcogenide would also have the same band gap as recited in claim 23.

The process of the sensitization includes dipping the nano-porous metal oxide in the metal chalcogenide solution several times (left column, page 3184), which is the same method as disclosed in the present application (see page 4 of the specification). Accordingly, the nano-porous metal oxide disclosed by Vogel is considered in-situ spectrally sensitized on the internal and external surface with metal chalcogenide nano-particles.

Vogel also discloses that the use of the sensitized nano-porous metal oxide as the electrode in the electrolyte containing  $\text{KH}_2\text{PO}_4/\text{K}_2\text{HPO}_4$  (left column, page 3184). As disclosed in the specification page 9 of the present application, the process of adding phosphate to the

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nano-porous metal oxide is to rinse the metal oxide with an aqueous solution containing a phosphate or phosphoric acid. Accordingly, the nano-porous metal oxide of Vogel is considered to contain the phosphate after the metal oxide immerses in the aqueous electrolyte solution containing the phosphate solution.

Therefore, Vogel meets the limitations of claims 23-24.

***Allowable Subject Matter***

4. Claim 25 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 12-22 and 26-27 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: the closest prior art is Vogel et al., which discloses the sensitization of various nanoporous metal oxides with quantum-sized metal chalcogenide. No prior art, alone or combinable with Vogel was found to teach the nano-porous metal oxide semiconductor in-situ spectrally sensitized on its internal and external surface with the metal chalcogenide nano-particles and further comprises a triazole or diazole compound as recited in claims 25-26.

No prior art, alone or combinable with Vogel was found to teach a photovoltaic device comprising the nano-porous metal oxide semiconductor as recited in claim 12.

***Response to Arguments***

5. Applicant's arguments filed 10/3/2002 have been fully considered but they are not persuasive.

Applicant argues that Vogel does not disclose or suggest the use of both a phosphoric acid and a phosphate.

Applicant amended claim 1 to include the limitation of nano-porous metal oxide comprising both phosphoric acid and phosphate in order to overcome the 35 USC 102(b) rejection made in the prior Office action based on Vogel et al. However, as stated above, the amendment is considered a new matter and therefore it is not permitted.

Applicant also argues that Vogel fails to disclose or teach the semiconductor as claimed, wherein the metal chalcogenide is selected from a certain group.

As stated above, Vogel clearly discloses the sensitization of nano-porous metal oxide semiconductor such as titanium oxide, tin oxide, niobium oxide and tantalum oxide by quantum-sized cadmium sulfide, lead sulfide, or antimony sulfide, which are the same nano-porous metal oxide semiconductor and metal chalcogenide as claimed in the present application.

***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

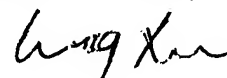
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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling X. Xu whose telephone number is 571-272-1546. The examiner can normally be reached on 8:00 - 4:30 Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah D. Jones can be reached on 571-272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ling X. Xu  
Examiner  
Art Unit 1775